

LETTERS TO THE EDITOR.

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Fine Chemicals for Research Purposes.

IN view of the shortage of fine chemicals which are used for research purposes, we thought it advisable to issue a circular to the principal laboratories in the kingdom asking for lists of chemicals not in immediate use, so that it would be possible to put the holders of such chemicals in touch with those chemists who were in urgent need of them. The replies which have been received so far have been in most cases to the effect that the holders wish to keep their own stocks in hand, but are willing to use our bureau for the purpose of purchasing others. As this attitude is one which entirely defeats the object with which the inquiry was started, may we direct the attention of chemists to the fact that it is impossible for them all to hold and to purchase at the same time. An equitable series of exchanges is all that can be arranged at the present time; and it should be remembered that even 50 grams of some particular substance may make all the difference between the carrying on or the hanging up of a piece of research work.

H. B. BAKER.

J. F. THORPE.

M. A. WHITELEY.

The Imperial College of Science and Technology,
South Kensington.

A Penalty on Research.

I AM sure that the biologists of the country will support Sir Wm. Ramsay's protest in NATURE of February 11, on the penalties incurred by men of science for the use of alcohol in their investigations. A few years ago I received a consignment of specimens of natural history in alcohol from a foreign Government expedition for scientific study and description. After some correspondence with the Customs House authorities I was allowed as a *concession* either to pay the full duty on the alcohol, or, in the presence of an officer, to pour it down the sink in the University laboratory, and replace it by methylated spirit at my own expense. Comment is unnecessary.

SYDNEY J. HICKSON.

The University of Manchester.

The Prices of Chemicals.

A WELL-KNOWN firm of dealers in chemicals and laboratory apparatus gave a quotation some days ago for the supply of an ounce each of dulcite and adonite. They proposed to charge 9*l.* 10*s.* for the former and 6*l.* for the latter. In the price list of chemicals issued by the same firm some months before the war the prices were respectively 45*s.* and 18*s.* Is there any good reason (except greed) for this increase of price? Presumably this firm, or some other English firm with which they deal have held a stock of these sugars since before the war. The substances are indispensable in public health bacteriological work, and is it not possible that some university laboratory can undertake their preparation and distribution at cost price?

J. J.

The University, Liverpool, February 3.

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WE are in receipt of your letter of February 8 with regard to the price of dulcite and adonite. We very much regret that your correspondent has not gone more fully into the matter before making charges against firms who are trying to help British industries at a critical time. We should welcome a visit from your correspondent as he may not know the difficulties which have been experienced in obtaining the raw material for the manufacture of dulcite. Dulcite originally was a by-product, and was sold at 4*s.* 6*d.* per oz. The price before the war rose in stages from 4*s.* 6*d.* to 15*s.*, then to 25*s.*, then to 35*s.*, and finally to 45*s.* per oz., which was the price ruling on August 1. We had at that time only a small stock of both dulcite and adonite, consisting of about 8 oz. We purchased a further supply of both these chemicals on or about August 18, but at considerably advanced prices, the supplies being obtained from wholesale chemical merchants in this country. We thereupon raised our prices to 100*s.* per oz. in the case of dulcite and 36*s.* per oz. for adonite; this gave us the same rate of profit as we had obtained from dulcite and adonite before the war.

This supply lasted us until December, when we were able to obtain a very small quantity of these two chemicals from small laboratories who had gone to the expense of manufacturing, and the prices being considerably advanced, necessitated the selling prices being raised accordingly.

At the present moment we have no dulcite of any description in stock, and have not had for some weeks. The total amount which we had for sale at a higher price did not exceed two ounces.

We have made arrangements with a firm of chemical manufacturers to manufacture for us dulcite and adonite at a price which will allow us to revert to the prices ruling between August and December last, but although delivery has been promised us several times we have not yet received delivery of even $\frac{1}{2}$ oz., and we shall be only too pleased to buy any quantity of dulcite and adonite at the present moment, irrespective of price; our main point is to be able to supply chemicals which are urgently needed, and not to obtain exorbitant profits, and in the case of these two chemicals we may state we have been to considerable expense in endeavouring to obtain the necessary raw material for the manufacture of dulcite and adonite.

A FIRM OF DEALERS IN CHEMICALS.

February 9.

British Supplies of Laboratory Ware.

As chairman of the British Laboratory Ware Association I have had my attention directed to a circular letter issued by the British Science Guild, dated January, 1915, to schools, colleges, universities, and technical institutes, and also to circular No. 885 issued by the Board of Education, dated January 11, 1915, and which I note is referred to in NATURE, page 580, January 21, 1915.

These circulars have been issued under a grave misapprehension, and are likely to give a very misleading idea of the present situation in reference to supplies of laboratory glassware, and I think that it is very important that any anxiety on behalf of the readers of NATURE should be immediately allayed. I therefore beg to place before you the following information:—

The British Laboratory Ware Association, which consists of about 75 per cent. of the apparatus supply firms in the United Kingdom, was formed a few days after the outbreak of the war, in order to co-operate in connection with the production in this country of

laboratory glassware, porcelain filter papers, etc., not hitherto produced in this country.

The association is not a ring or financial combine, but is merely arranged for the pooling of information and for saving as much time, and preventing as far as possible duplication of correspondence with works, in the way of inquiries and information; the standardisation of sizes for moulds where works undertake to make; and the elimination of difficulties which would occur if all the various firms were working independently.

So far, after months of correspondence, interviews, conferences, meetings, and considerable expense, the association has solved the problem in connection with glass ware, and in a few weeks' time the various firms constituting the association will be in a position to supply the most useful sizes of glass beakers and flasks in an English-made glass similar to Jena glass, which has been tested by well-known English men of science, and can be definitely and safely recommended.

The same holds good for porcelain evaporating basins, beakers, crucibles, and covers, etc., and also for an English-made filter paper equal to the German quality of Schleicher and Schull No. 595, and further qualities of these filter papers will be forthcoming very shortly. Also, as time goes on, further items will be added to the list, as negotiations are brought to a successful issue.

You will therefore see that a great deal of important and valuable work has been done, and that the problem of glassware has been to a very great extent solved so that an English-made glass equal to the well-known Jena glass will be on the market and can be supplied in a few weeks from the present time by the various firms constituting the British Laboratory Ware Association.

C. A. MERCER,
Chairman of the British Laboratory
Ware Association, Ltd.

34 Camomile Street, E.C., London, February 8.

Problems of Radiation.

THE study of the production of homogeneous Röntgen radiation reveals some of the most interesting and suggestive facts bearing upon the problems of radiation. A few of these will be briefly indicated.

The emission of a fluorescent X-radiation by an element exposed to a primary X-radiation of shorter wave-length necessitates the absorption of a greater amount of energy from the exciting primary beam. It is possible definitely to assign a given portion of the energy absorbed from the primary beam as connected with the emission of a particular fluorescent radiation (Barkla and Sadler, *Phil. Mag.*, 1909.) The element exposed to this primary radiation emits also a corpuscular radiation, a portion of which is definitely associated with each fluorescent X-radiation. From measurements of these associated quantities, certain broad conclusions have been found to hold at least approximately in all cases hitherto dealt with; they hold within the limits of experimental error in the one case carefully investigated. These are:—

(1) The number of quanta of fluorescent X-radiation emitted is equal to the number of high-speed electrons in the corpuscular radiation (the associated corpuscular radiation).

(2) The total energy in the corpuscular and fluorescent radiations is equal to that of the primary beam absorbed.

These are not merely hypotheses which by trial may

be found to be consistent with quantitative measurements of the energies of the two secondary radiations, but are the only rational conclusions which can be drawn from experiments on *some* substances. The deviations which have been observed in other cases are subjects for further investigation; the nature of these will be indicated later.

These conclusions may be described in greater detail as follows:—

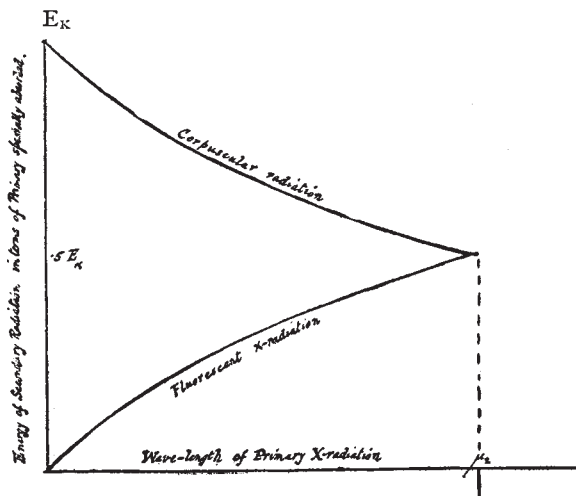
If a primary Röntgen radiation of wave-length μ_1 fall upon an element with a characteristic radiation of wave-length μ_2 , then provided μ_1 is less than μ_2 the primary radiation is specially absorbed, and the element emits the particular fluorescent X-radiation, together with an associated corpuscular radiation. If we denote the energy of the primary specially absorbed in connection with the emission of the fluorescent radiation (of Series K, say) by E_K , the energy of the associated corpuscular and fluorescent radiations by C_K and F_K respectively, then $E_K = C_K + F_K$. Also as the energy of each electron in the corpuscular radiation is approximately (possibly accurately) that of a quantum of the primary radiation (we make the usual assumption here, that there is only one velocity of ejection; good reason can, however, be given for this):—

$$\begin{aligned} F_K &= \text{energy of fluorescent radiation} = \\ C_K &= \text{energy of corpuscular radiation} = \\ &= \frac{\text{energy of quantum of fluorescent radiation}}{\text{energy of quantum of primary radiation}} = \frac{\mu_1}{\mu_2} \end{aligned}$$

hence:—

$$C_K = \frac{\mu_2}{\mu_1 + \mu_2} E_K \text{ and } F_K = \frac{\mu_1}{\mu_1 + \mu_2} E_K$$

So we obtain expressions for the energies of fluorescent radiation (series K) and the associated corpuscular radiation in terms of that of the specially absorbed primary energy, for primary radiation of any wave-length. Plotting energies of secondary radiations and wave-length of primary radiation, we get the curves shown in the accompanying diagram:—



Thus when μ_1 is just less than μ_2 , the energy is equally divided between the corpuscular and fluorescent X-radiations. As μ_1 diminishes a greater proportion of the energy goes into the corpuscular radiation, and less into the fluorescent, until for very short waves all the energy is taken up by the corpuscular radiation.

The above simple theory agrees exceedingly well with the experimental results obtained with the element